Program:

Define Simulator and Nodes

set ns [new Simulator]

set n0 [$ns node]

set n1 [$ns node]

set n2 [$ns node]

set n3 [$ns node]

set n4 [$ns node]

set n5 [$ns node]

Set node colors and labels

$n0 color "purple"

$n1 color "purple"

$n2 color "violet"

$n3 color "violet"

$n4 color "chocolate"

$n5 color "chocolate"

$n0 shape box ; $n1 shape box ; $n2 shape box

$n3 shape box ; $n4 shape box ; $n5 shape box

Label the nodes

$ns at 0.0 "$n0 label SYS0"

$ns at 0.0 "$n1 label SYS1"

$ns at 0.0 "$n2 label SYS2"

$ns at 0.0 "$n3 label SYS3"

$ns at 0.0 "$n4 label SYS4"

$ns at 0.0 "$n5 label SYS5"

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# Set trace files

set nf [open goback.nam w]

$ns namtrace-all $nf

set f [open goback.tr w]

$ns trace-all $f


# Define network topology and queues

$ns duplex-link $n0 $n2 1Mb 20ms DropTail

$ns queue-limit $n0 $n2 5

$ns duplex-link $n1 $n2 1Mb 20ms DropTail

$ns duplex-link $n2 $n3 1Mb 20ms DropTail

$ns duplex-link $n3 $n4 1Mb 20ms DropTail

$ns duplex-link $n3 $n5 1Mb 20ms DropTail


# Set up TCP agent and FTP app

set tcp [new Agent/TCP]

$tcp set fid 1

$ns attach-agent $n1 $tcp

set sink [new Agent/TCPSink]

$ns attach-agent $n4 $sink

$ns connect $tcp $sink

set ftp [new Application/FTP]

$ftp attach-agent $tcp


# Start FTP transfer and simulate errors

$ns at 0.05 "$ftp start"

$ns at 0.06 "$tcp set windowInit 6"
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$ns at 0.06 "$tcp set maxcwnd 6"

$ns at 0.25 "$ns queue-limit $n3 $n4 0"

$ns at 0.26 "$ns queue-limit $n3 $n4 10"

$ns at 0.305 "$tcp set windowInit 4"

$ns at 0.305 "$tcp set maxcwnd 4"

$ns at 0.368 "$ns detach-agent $n1 $tcp ; $ns detach-agent $n4 $sink"

$ns at 1.5 "finish"

Trace annotations

$ns at 0.0 "$ns trace-annotate \"Go-Back-N start\""

$ns at 0.05 "$ns trace-annotate \"FTP starts\""

$ns at 0.06 "$ns trace-annotate \"Send 6 Packets from SYS1 to SYS4\""

$ns at 0.26 "$ns trace-annotate \"Error: Packet 4 not ACKed\""

$ns at 0.30 "$ns trace-annotate \"Retransmit Packets 4-6\""

$ns at 1.0 "$ns trace-annotate \"FTP stops\""

Finish procedure

proc finish {} {

   global ns nf

   $ns flush-trace

   close $nf

   puts "Simulation complete."

   exec nam goback.nam &

   exit 0

}

$ns run